



U.S. Department  
of Transportation  
**Research and  
Special Programs  
Administration**

400 Seventh St., S.W.  
Washington, D.C. 20590

OCT 29 2004

Mr. Pardhasarathi Chilukuri  
Cusco Fabricators, Inc.  
305 Enford Road  
Richmond Hill, L4C3E9  
Ontario, CANADA

Reference No. 04-0242

Dear Mr. Chilukuri:

This is in response to your October 1, 2004 e-mail to Waider Wong, Structural Design Engineer, Federal Highway Administration, asking if Finite Element Analysis (FEA) or hand calculations may be used to verify that DOT 407 and DOT 412 series cargo tank bumpers, described here as rear-end protection devices, and rollover guards, described here as overturn protection devices, meet the performance requirements of the Department of Transportation's (DOT's) Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). Specifically, you ask if you can use hand calculations to verify the performance of the design for the non-linear portion of the deflection of an overturn protection device and a rear-end protection device.

The HMR do not require or prohibit FEA calculations to verify the performance of a particular design nor do they require or prohibit physical testing. Each cargo tank or cargo tank motor vehicle design type must be certified to conform to its specification requirement by a Design Certifying Engineer (DCE). See § 178.320(b)(1). The DCE's responsibility for certifying the cargo tank motor vehicle design type includes verification of the method of analysis and its justification. If a manufacturer's DCE can demonstrate by hand calculations that the accident damage protection devices meet the performance requirements for strength and/or displacement of the DOT 400 cargo tank series specifications, DOT will perform the same level of calculations to verify compliance with the requirements. On the other hand, if the manufacturer chooses to use FEA to justify its design, DOT will conduct an independent analysis with commercial FEA codes, such as ANSYS and Ls-Dyna, to validate the modeling output results. Also, § 178.320(b)(2) states the DCE must furnish to the manufacturer of a cargo tank that complies with its specification requirements a certificate to denote its compliance. The certificate and the required sketches, drawings, and calculations used to obtain certification must each be signed by the DCE.

I hope this satisfies your request.

Sincerely,

Hattie L. Mitchell, Chief  
Regulatory Review and Reinvention  
Office of Hazardous Materials Standards



040242

178.320

**Gorsky, Susan**

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**From:** Shelton, Danny [Danny.Shelton@fmcsa.dot.gov]  
**Sent:** Thursday, October 14, 2004 7:55 AM  
**To:** Gorsky, Susan <RSPA>  
**Subject:** RE: Cusco draft 1

Edmonson  
\$ 178.320  
Cargo Tanks  
Design Certification  
04-0242

Here it is.

**From:** sarathi C [mailto:sarathi@wastequipcusco.com]  
**Sent:** Friday, October 01, 2004 9:59 AM  
**To:** Wong, Waider  
**Subject:** Interpretation

Dear Mr. Waider Wong,

For design of the Bumper and Rollover Guards of DOT 407 / 412, for the nonlinear portion of the deflection (of minimum 6"), hand calculations are not reliable as they can not give accurate results in my opinion.

However I found some DCEs are performing hand calculations while some others are performing FE analysis which is more expensive. What is acceptable to DOT and what is not permitted by DOT?

Is there any rulings by DOT that hand calculations alone (without any testing) are not acceptable.

May I request you to let me know the direction given by DOT in this regard?

Regards,  
Sarathi

-----Original Message-----

**From:** Gorsky, Susan <RSPA>  
**Sent:** Thursday, October 14, 2004 7:49 AM  
**To:** Shelton, Danny  
**Subject:** RE: Cusco draft 1

Thanks for the draft. Can you forward the original email from Mr. Chilukuri?

Susan

-----Original Message-----

**From:** Shelton, Danny [mailto:Danny.Shelton@fmcsa.dot.gov]  
**Sent:** Wednesday, October 13, 2004 12:49 PM  
**To:** Gorsky, Susan <RSPA>  
**Cc:** Staniszewski, Stanley <RSPA>; Olson, Philip <RSPA>  
**Subject:** Cusco draft 1

Now is this service or what. Let me know what else you need from me. P.S. Stan and Phil did look at the letter and made comments. Their changes are incorporated in the letter.

## Gorsky, Susan

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**Full Name:** ~~Pardhasarathi~~  
**Last Name:** **Chilukuri**  
**First Name:** Pardhasarathi  
**Job Title:** DCE & Tank Inspector  
**Company:** Cusco Fabricators, Inc.

**Business Address:** 305 Enford Road,  
Richmond Hill,  
Ontario L4C 3E9  
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**Business:** (905) 883-1214 Extn. 229  
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**E-mail:** sarathi@wastequipcusco.com  
**E-mail Display As:** Pardhasarathi C (sarathi@wastequipcusco.com)

**Birthday:**



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400 Seventh Street, S.W.  
Washington, D.C. 20590

SEP 30 1999

Mr. Frank B. Postma, P.G.  
Project Manager  
Corporate Environmental Advisors, Inc.  
127 Hartwell Street  
West Boylston, MA 01583

Ref. No. 99-0244

Dear Mr. Postma:

This responds to your letter dated August 25, 1999, requesting clarification of the incident reporting requirements in § 171.16 of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). Specifically, you ask if a carrier is required to file an incident report in accordance with § 171.16 for a release from a motor vehicle fuel tank or from a motor vehicle's hydraulic, cooling, or lubrication systems.

The answer is no. A hazardous materials carrier must file DOT Form F 5800.1 within 30 days of an unintentional release of hazardous materials from a package, including a tank, or if any of the circumstances set forth in § 171.15 occurs. A motor vehicle fuel tank that meets the requirements for all fuel systems under §§ 393.65 and 393.69 of the Federal Motor Carrier Safety Regulations, including marking, is maintained in accordance with NFPA/ASME standards for fuel systems, and is not used as a packaging for hazardous materials is not subject to the requirements of the HMR. Similarly, a motor vehicle's hydraulic, cooling, and lubrication systems are not packaging for hazardous materials and, thus, are not subject to the HMR.

I hope this information is helpful. If you have further questions, please do not hesitate to contact this office.

Sincerely,

Thomas G. Allan  
Senior Transportation Regulations Specialist  
Office of Hazardous Materials Standards



990244

171.16



CORPORATE ENVIRONMENTAL ADVISORS, INC.

August 25, 1999

USDOT/RSPA (DHM 10)  
400 7<sup>th</sup> Street, Southwest  
Washington, D.C. 205090-0001

**ATTN: Mr. Edward Mazzullo, Director for office of Hazardous Materials  
Standards**

**RE: Official Interpretation of Regulation 49 CFR 171.16**

Dear Mr. Mazzullo,

Corporate Environmental Advisors, Inc. (CEA) requests an official interpretation of the United States Department of Transportation (USDOT) regulation 49 CFR 171.16 as it pertains to the following scenario. Is a carrier of hazardous materials required to submit a detailed incident report on Form F5800.1 in duplicate as required by the aforementioned regulation if a release occurred from the fuel tanks used for propulsion of the vehicle and not from the mobile bulk storage tank. It is our understanding that tanks used for propulsion are exempt under the Federal Materials Transportation Law (49 U.S.C. 5101 et seq.) and 49 CFR 171-180. Additionally, would this exemption also include other materials used in the operation of the vehicle (i.e. hydraulic systems, cooling systems, lubrication systems, etc.).

Thank you for your attention to our request.

Sincerely,  
*Corporate Environmental Advisors, Inc.*

Frank B. Postma, P.G.  
Project Manager

Gorskey  
8 171.16  
99-0294